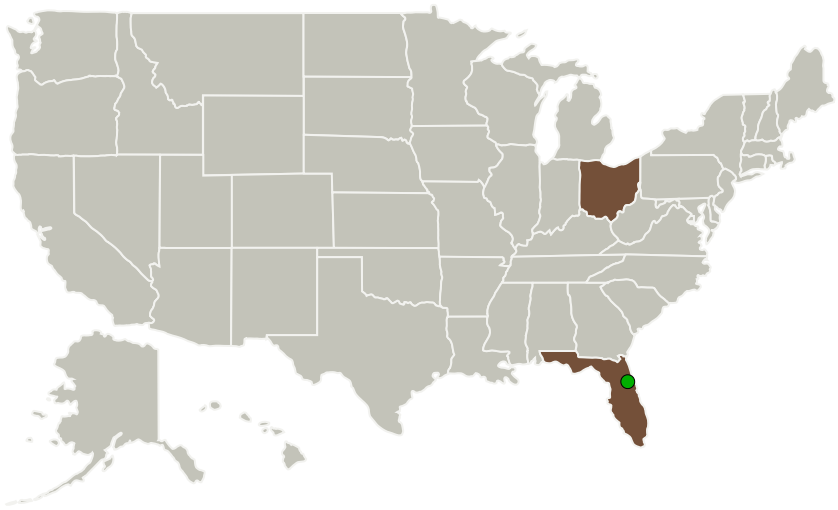
Load-Bearing Tank-Applied Multi-Layer Insulation, Phase I

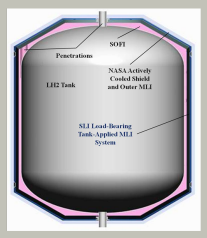
Completed Technology Project (2013 - 2013)

Project Introduction

The proposed load-bearing, tank-applied, multi-layer insulation system consists of a set of highly reflective radiation shields made from 1 mil thick aluminized Mylar that is supported from a "pop-up tent like" support frame. In addition, the support frame carries the mass of an actively cooled shield and outer MLI blanket enabling ultra low heat leak storage of cryogenic fluids. The support frame is conveniently mounted to the top and bottom center tank penetrations, eliminating any direct supports to the cryogen tank itself, which reduces the heat leak to near the theoretical minimum. The novel design approach is significantly better than conventional MLI, which does not possess the required structural or thermal capabilities required. The technical approach is to integrate low-risk, high Technology Readiness Level (TRL) (TRL 7-9) components into a new and unique low-cost, light-weight, high-strength, thermally efficient MLI system. This approach enables the system to meet and exceed all requirements for reduced heat leak, low-mass, and high strength to withstand flight loads. The NASA Cryogenic Propellant Storage and Transfer Program will directly benefit from the development of the proposed MLI system.

Primary U.S. Work Locations and Key Partners





Load-Bearing Tank-Applied Multi-Layer Insulation

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Completed Technology Project (2013 - 2013)

Organizations Performing Work	Role	Type	Location
Sierra Lobo Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	
Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida

Primary U.S. Work Locations	
Florida	Ohio

Project Transitions

May 2013: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138258)*

Images

Project Image
Load-Bearing Tank-Applied Multi-Layer Insulation
(https://techport.nasa.gov/image/132572)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Sierra Lobo Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Mark S Haberbusch

Co-Investigator:
Mark S Haberbusch

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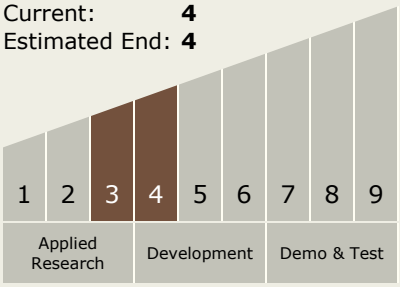
Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.1 In-space Propellant Storage & Utilization

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System